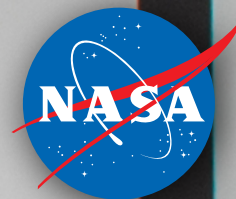


National Aeronautics and Space Administration



GoddardView

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TRENDING



Webb Family Gets Firsthand Look at Namesake Telescope
James Webb Jr. and several of his family members visited Goddard to observe the James Webb Space Telescope. The telescope, which will launch in 2018, is named after Webb's father, who was also NASA's second administrator.

Expedition 47 Crew Returns Safely to Earth
NASA astronaut Tim Kopra and two colleagues from ESA and Roscosmos landed in Kazakhstan on June 18. The crew spent six months aboard the International Space Station carrying out human health studies.



Transgender Activist Addresses Goddard
As part of LGBT Pride Month, activist and author Jennifer Finney Boylan spoke to Goddard about her life as a transgender individual and discussed ways to make organizations more inclusive of the LGBT community.

Goddard Welcomes 2016 Summer Interns
More than 400 interns arrived on June 6 to begin their internships for the summer. The students will work alongside scientists, engineers and mission support teams conducting research in their fields of interest.



GoddardView

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On the cover: Goddard scientist Piers Sellers addresses center employees after receiving the NASA Distinguished Service Medal, the highest honor bestowed by the agency.

Photo credit: NASA/Goddard/Bill Hrybyk

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GoddardView Info

Goddard View is an official publication of [NASA's Goddard Space Flight Center](#) in Greenbelt, Maryland. Goddard View showcases people and achievements in the Goddard community that support the center's mission to explore, discover and understand our dynamic universe. [Goddard View](#) is published by the Goddard Office of Communications.

You may submit story ideas to the editor at darrell.d.delarosa@nasa.gov. All contributions are subject to editing and will be published as space allows.

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By [Ashley Morrow](#)

"When I was a kid, I watched the Apollo launches from across the ocean, and I thought NASA was the holy mountain," said Piers Sellers, deputy director of sciences and exploration at NASA's Goddard Space Flight Center, of his childhood in the United Kingdom. "As soon as I could, I came over here to see if I could climb that mountain."

Thirty-four years after arriving at Goddard in 1982, he has reached the summit. On June 2, NASA Administrator Charles Bolden made a special trip to the center to present Sellers with the NASA Distinguished Service Medal, the highest honor the agency can bestow. The award – whose past recipients include the likes of Neil Armstrong, John Glenn and James Webb – is reserved for those whose "distinguished service, ability, or vision has personally contributed to NASA's advancement of United States' interests."

Sellers began his Goddard career constructing models of the global climate system, particularly in relation to the biosphere and atmosphere. He worked as a climate research scientist in a variety of roles until 1996 when he was selected as a NASA astronaut. Sellers flew aboard three missions to the International Space Station and completed six spacewalks, totaling 35 days in space.

In 2011, following his retirement from the astronaut corps, Sellers returned to Goddard where he has since provided leadership and guidance to the center's cadre of more than 2,000 scientists. He once again took up his mission to study the changing climate and share his views with audiences worldwide.

"Piers is the premier U.S. scientist speaking about climate change – writing articles, talking on TV, and carefully explaining the observations and models to representatives of Congress and little schoolchildren alike," said Colleen Hartman, director of sciences and exploration at Goddard, who nominated Sellers for the award. "By confronting the facts, Piers is changing minds."

When he speaks about a problem that seems insurmountable to many, Sellers' message is full of hope. He believes that humanity has faced such problems in the past and has the resources to find solutions.

"There is no convincing, demonstrated reason to believe that our evolving future will be worse than our present, assuming careful management of the challenges and risks," Sellers wrote in a Jan. 16 op-ed for The New York Times. "History is replete with examples of us humans getting out of tight spots."

Sellers has spoken to countless news stations, written for multiple newspapers and continued to help advance Earth science at Goddard.

"Piers, if there is anyone who deserves this award, it is you, for all you've done and are continuing to do and will do," Bolden told Sellers during the presentation.

Sellers accepted the award on behalf of everyone in attendance and all the people he has worked with throughout his career.

It is possible Sellers saw some of his enthusiasm and the impact of his work at the agency reflected back to him at the award ceremony. The room was packed with many attendees standing and additional people streamed into an overflow room down the hall. The scientist and former astronaut received two standing ovations.

But Sellers refused to take credit. "I owe this agency everything," he said. ■

Above: NASA Administrator Charles Bolden (right) presents Piers Sellers, Goddard deputy director of sciences and exploration, the NASA Distinguished Service Medal.

Photo credit: NASA/Goddard/Bill Hrybyk

PACE MISSION WILL UNCOVER NEW INFORMATION ABOUT HEALTH OF OUR OCEANS

By Patricia Flores

NASA's Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission is a first-of-its-kind project that aims to answer key questions about the consequences of climate change on the health of our oceans and their relationship with airborne particles and clouds. PACE will use a wide spectrum of wavelengths from an "ocean color" instrument to provide scientists with this information.

"PACE represents a major effort to truly combine ocean research with atmospheric research," Project Scientist Jeremy Werdell said. "We are going to go beyond just seeing that Earth's climate is changing to better understanding why the change is occurring."

PACE was approved to move forward out of its preliminary stage of planning on June 16 at the Key Decision Point A (KDP-A) event. A significant milestone for this next stage is that the official mission budget becomes available for use on July 1, Project Manager Andre Dress said.

The primary instrument for this mission is named the Ocean Color Instrument (OCI), which will collect hyperspectral measurements from the ultraviolet to the shortwave infrared – a range that is broader than its predecessor satellite instruments, SeaWiFS, MODIS, and VIIRS – to examine and monitor how phytoplankton communities in the ocean are changing in space and time. The OCI will provide precise measurements of the ocean surface to allow researchers to see the concentrations of different phytoplankton communities all over the globe. The spectral range and resolution of the OCI design will substantially advance the ability to distinguish between different species of phytoplankton compared to predecessor satellite instruments.

Phytoplankton play an essential role in ocean ecosystems. They are the base of the marine food chain and, like land plants, produce much of the oxygen we breathe and play a role in reducing atmospheric carbon dioxide levels. With growing concern about the impact of rising global temperatures on our oceans, PACE data will be used to unveil new information about changing patterns in phytoplankton composition and the emergence of potentially harmful algal blooms. Satellites that currently exist are adept at detecting algal blooms, but cannot unequivocally determine their composition – for example, if they are harmful to fish or can contaminate drinking water. The

spectral range of OCI will help scientists figure out more about where blooms occur and how they are changing.

The possible addition of a polarimeter, an instrument that could provide multi-angle polarized radiometric measurements to advance studies of aerosol particles and clouds, is currently under consideration by the PACE team. A polarimeter would allow improved measurement of atmospheric particle compositions that will ultimately improve observations of ocean color. Normally, roughly 90 percent of what an ocean color satellite instrument measures when over the oceans is the atmosphere, which has to be subtracted out to reveal the ocean signal.

Ongoing field campaigns and the collection of data at sea provide critical information that helps scientists and engineers plan and design this new mission. For example, the North Atlantic Aerosols and Marine Ecosystems Study (NAAMES) campaign, which had its most recent deployment during May 2016, collected a wealth of information from both a ship and an airplane to validate satellite measurements and give a three-dimensional perspective that includes what's happening beneath the surface. "NAAMES is helping us answer fundamental questions we have about processes in the ocean,"

said PACE Communications Coordinator and scientist Stephanie Uz. "The measurements they and other field campaigns collect at sea contribute to PACE being a giant leap forward in ocean and atmosphere research."

All preliminary planning for PACE is currently being done at NASA's Goddard Space Flight Center. The unique information that this mission will provide, in combination with climate models, will allow for scientists to monitor the health of our oceans and their response to climate change like never before.

"We are putting all this carbon dioxide into the atmosphere and causing oceans to be more acidic at the same time that the oceans are warming and coming under stress from a range of human activities," Uz said. "All of this is affecting the ocean in ways we don't fully understand...PACE will help us comprehend what we have now and how it is changing." ■

Image credit: NASA/Goddard



RESTORE-L MISSION TO REFUEL LANDSAT 7, DEMONSTRATE CROSSCUTTING TECHNOLOGIES

By Adrienne Alessandro

Disruptive technologies have often changed the course of history, breaking the status quo and unlocking possibilities that have yet to be imagined. Building on a history of upgrading and maintaining assets in space, NASA is developing a new capability while creating a paradigm shift: robotic satellite servicing.

In May, NASA officially moved forward with plans to execute the ambitious, technology-rich Restore-L mission, an endeavor to launch a robotic spacecraft in 2020 to refuel a live satellite. The mission – the first of its kind in low-Earth orbit – will demonstrate that a carefully curated suite of satellite-servicing technologies is fully operational. The current candidate client for this venture is Landsat 7, a government-owned Earth-imaging satellite in low-Earth orbit.

The Restore-L mission will also test other crosscutting technologies that have applications for several critical upcoming NASA missions. As the Restore-L servicer rendezvouses with, grasps, refuels and relocates a client spacecraft, NASA will check important items off of its technology checklist that puts humans closer to Mars exploration.

Restore-L technologies include an autonomous relative navigation system with supporting avionics, and dexterous robotic arms and software. The suite includes a tool drive that supports a collection of sophisticated robotic tools for robotic spacecraft refueling, and a propellant transfer system that delivers measured amounts of fuel at the proper temperature, rate and pressure.

Future candidate applications for individual Restore-L technologies include on-orbit manufacturing and assembly, propellant depots, observatory servicing, and orbital debris management. NASA is also directly applying several Restore-L technologies to NASA's Asteroid Redirect Mission.

The robotic vehicle of the mission directly leverages Restore-L's autonomous rendezvous system, avionics, dexterous robotics and software, and tool drive and other systems. This mission, along with the Wide Field Infrared Survey Telescope observatory, is being designed to be refuelable.

NASA's second, equally important objective for Restore-L is to infuse its technologies to domestic commercial entities to help jump-start a new, competitive industry in robotic satellite servicing, an area ripe with possibility.

"Restore-L effectively breaks the paradigm of one-and-done spacecraft," said Frank Cepollina, veteran leader of the five servicing missions to the Hubble Space Telescope and associate director of the Goddard Satellite Servicing Capabilities Office, which first conceived the Restore-L concept and developed its technology portfolio.

Currently, spacecraft launch with a finite amount of fuel, their life spans restricted by the amount of propellant within their metal spacecraft buses at launch. A refueling capability in space, offered by future propellant-delivery spacecraft similar to Restore-L, could provide satellite owners the ability to manage, maintain and save their most valuable assets in space.

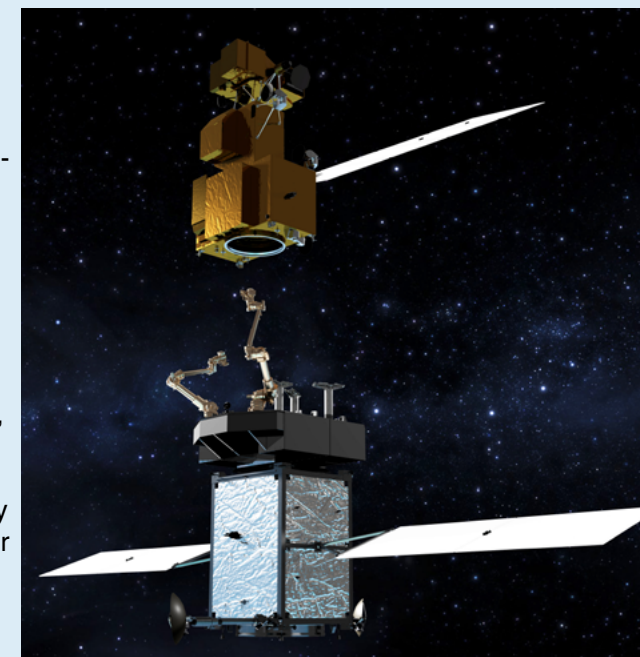
Restore-L's technologies are foundational for other ambitious objectives beyond refueling. "You cannot entirely forecast how the aerospace community will run with new, capability-building servicing technologies, but we can predict likely short-term innovations," said Benjamin Reed, SSCO deputy project manager.

"With robotic servicing on the table, satellite owners can extend the life span of satellites that are running low on fuel, reaping additional years of service – and revenue – from their initial investment. If a solar array or a communications antenna fails to deploy, a servicer with inspection cameras and the right repair tools could help recover the asset that otherwise would have been lost," Reed added.

Servicing capabilities could help satellite owners better manage their space assets in innovative ways. This could include launching a spacecraft with a half-empty fuel tank and allotting the saved weight to mission-specific instruments. "Dependable robotic satellite servicing unlocks countless opportunities," Reed said. ■

Center: Artist rendering of the Restore-L servicer extending its robotic arm to grasp and refuel a satellite in orbit.

Image credit: NASA/Goddard





Andrew Glendening

Code 373, Materials and Processes Assurance Engineer

Why Goddard?: The opportunity for new and interesting challenges.

Hobbies/interests: cooking, science fiction, frisbee



Geronimo Villanueva

Code 693, Planetary Scientist

Why Goddard?: It has always been my dream to be part of such an engaging organization.

Hobbies/interests: traveling, winter sports, exercise



Stephanie Vidal

Code 221, Directorate Planner

Why Goddard?: To advance my career in support of a mission that serves my country and all of humankind.

Hobbies/interests: sports, STEM mentoring, family, friends, puppy



Jonathan X. Santiago Gonzalez

Code 568, Student Trainee (Engineering)

Why Goddard?: I've always dreamt of working for NASA.

Hobbies/interests: reading, tourism, photography



Olumide Onanuga

Code 114, Pathways Intern

Why Goddard?: Teamwork, challenge, history and stepping outside the human comfort zone.

Hobbies/interests: bowling, camping, traveling



Elaine Stewart

Code 546, Student Trainee (Engineering)

Why Goddard?: The opportunity to research and make technological advances in order to further space exploration.

Hobbies/interests: cooking, ballet, Zumba, traveling, exercise



Joseph MacGregor

Code 615, Research Physical Scientist

Why Goddard?: New challenges in studying the future of ice sheets.

Hobbies/interests: weightlifting, hiking, polar history

EMPLOYEE SPOTLIGHT

Goddard is pleased to welcome these new employees to the NASA community.

STUMPED? NASA CROWDSOURCING PLATFORMS OFFER POTENTIAL SOLUTIONS

By *Lori Keesey*

Stumped? Is a challenge keeping you up at night? No worries. You might consider getting help from one of NASA's two web-based crowdsourcing programs that are already proving invaluable to Goddard employees.

Begun about five years ago with support from the White House Office of Science and Technology Policy, the initiatives – developed by NASA's Johnson Space Center in Houston – allow employees to tap into the knowledge and experience of others.

"These online services are helping our scientists and engineers solve tricky technical difficulties without fear of giving away their intellectual property or jeopardizing their competitive edge," said Goddard Chief Technologist Peter Hughes.

The internal platform, NASA@work, is free to agency employees and solicits solutions exclusively from NASA employees and contractors. Those whose solutions are selected might be offered nonmonetary prizes, such a center tour, an astronaut autograph or an item flown in space.

The external platform, operated through NASA's Center of Excellence for Collaborative Innovation (CoECI), seeks solutions from a much broader global online community of vetted and trusted experts from government, academia and industry. Because the external platform offers prize money to those whose solutions are selected, users can expect to pay somewhere between \$3,000 and about \$50,000 depending on the type of challenge, community engagement, and the marketing and solver engagement strategies involved.

Statistics bear out the usefulness of these programs. NASA@work, for example, has posted 83 challenges since its inception. Of those, 89 percent produced a solution that was ultimately put to use.

Goddard astrophysicist Stan Hunter is already seeing the power of the NASA@work platform. On June 6, Hunter posted a challenge soliciting ideas on how to assemble and interconnect detector components for a next-generation gamma-ray telescope he is building. By June 20, he had already received six proposed solutions.

While ideal for employees trying to develop a space-based technology, solutions are also often available to the nontechnical NASA community. That was the case for Elizabeth MacDonald, a research astrophysicist at the Goddard Geospace Physics Laboratory who teaches scientists and engineers how to communicate more clearly with nontechnical audiences. She used NASA@work to solicit videos of employees describing their jobs without using acronyms, buzzwords or other technical jargon. MacDonald received 50 videos and ultimately selected two of them as winners.

One winning entry came from Goddard postdoctoral fellow Michael Kirk. "It was a cool way to share my expertise with someone I didn't normally interact with," he said. "It allowed me to provide additional value to NASA on something I might not have been aware of or had access to."

Tamara Jackson, Goddard equal employment opportunity specialist, serves as the center's liaison for the programs alongside Goddard software engineer Anne Koslosky. "The open innovation team will work with you, in collaboration with Johnson's NASA@work and CoECI programs, to help you decide which crowdsourcing platform best meets your challenge and funding considerations," Jackson said.

"We hope that NASA@work and the external challenge programs will encourage people who are all trying

to solve the same problems from different perspectives to work together and share their progress," added Koslosky. "In the end, it is a 'win-win' for both the challenge owners and the winning solution proposers." ■

For more information about these crowdsourcing programs, contact Tamara Jackson at tamara.jackson@nasa.gov or Anne Koslosky at anne.koslosky@nasa.gov.

Center: Goddard systems engineer James Sturm (left) discusses NASA's crowdsourcing options for his work with (from second from left to right) NASA detailee Laura Anthonson, Goddard software engineer Anne Koslosky, Steve Rader from NASA's Center of Excellence for Collaborative Innovation, NASA@work manager Carissa Callini and Goddard Equal Employment Opportunity Specialist Tamara Jackson.

Photo credit: NASA/Goddard





U.S. REP. STENY HOYER VISITS GODDARD

By [Kelly Ramos](#)



U.S. Rep. Steny Hoyer of Maryland visited NASA's Goddard Space Flight Center for a town hall meeting on June 27. He discussed his plan to continue advocating for Goddard's and NASA's ongoing missions and the work done by NASA employees.

Hoyer spoke about how proud he is of the scientific research at Goddard and the importance it holds in our society.

"Your work here at Goddard has a proven track record of bringing in innovation, new technology and economic growth to the private sector that helps America maintain its global leadership in science and technology," he said. "This mission, your mission, has great potential to reshape our understanding of physics and of the cosmos."

He briefly spoke about the Plankton, Aerosol, Cloud, ocean Ecosystem mission – or PACE – which will help us better understand space, climate change and the health of our oceans.

Following his speech, he took questions from employees at Goddard, NASA's Wallops Flight Facility in Virginia and NASA's Goddard Institute for Space Studies in New York. He also visited the James Webb Space Telescope, which will complement the discoveries of the Hubble Space Telescope upon its completion and launch in 2018. ■

Photo credits: NASA/Goddard/Bill Hrybyk



OPSPARC SPINOFF CHALLENGE WINNERS COME TO GODDARD FOR WORKSHOP, AWARDS

By [Ashley Morrow](#)

From June 28 through 30, winners of the OPTIMUS PRIME Spinoff Promotion and Research Challenge (OPSPARC) explored NASA's Goddard Space Flight Center. The TRANSFORMERS-themed contest encourages elementary, middle and high school students to find new and innovative ways to use NASA technology for the benefit of society.

Using the online platform Glogster, students made posters illustrating their ideas, and the public voted for its favorites. Three teams emerged as winners of their respective grade levels.

Sophia Sheehan of Incarnation Elementary School won the elementary school category for her invention of the "blow coat," a winter coat that would help people in her hometown of Chicago stay warm in the coldest months by blowing warm air through the use of solar panels.

Heidi Long, Aubrey Nesti, Katherine Valbuena and Jasmine Wu of Pacific Middle School in Vancouver, Washington, won the middle school category for their idea called "Tent-cordion," which would use spacesuit and satellite insulation materials in a foldable tent structure to house refugees and the homeless.

Jake Laddis, Alex Li, Isaac Wecht and Isabel Wecht of Tappan Zee High School in Orangeburg, New York, won in the high school category for their idea to use sunshield technology from the James Webb Space Telescope to shield houses from summer heat and reduce the need for air conditioning around the world. They developed their idea in a virtual gaming environment.

During their three-day workshop at Goddard, the students toured the center, met with scientists and engineers, observed the James Webb Space Telescope in the Goddard Space Systems Development and Integration Facility, and made videos about their spinoffs in Goddard's TV studio.

"I want to fly in one of those rockets," said Heidi Long of her experience. "I want to go to Mars."

The workshop culminated in an awards ceremony on center. Students were presented with an on-the-spot engineering challenge, and New York-based soul choir Music With a Message provided the entertainment. Goddard Center Director Chris Scolese and Peter Cullen – the voice of OPTIMUS PRIME himself – presented the OPSPARC students with trophies for their hard work and creativity. ■

Above: Voice actor Peter Cullen (center) – the voice behind OPTIMUS PRIME in the original "TRANSFORMERS" animated series – works with winning OPSPARC students in the Goddard TV studio to develop videos about their proposed NASA spinoffs. Photo credit: NASA/Goddard/Bill Hrybyk

Below: Winning students from the OPSPARC competition pose with their prizes following the awards ceremony at NASA's Goddard Space Flight Center. Photo credit: NASA/Goddard/Sophia Ryan



GEWA BRINGS THE PARTY



On June 30, the Goddard Employees Welfare Association hosted its first annual Block Party at the Barney and Bea Recreation Center. Hundreds of employees attended the event for an afternoon of fun, food and community.

Several of Goddard's own bands and disc jockeys provided the entertainment. Center clubs discussed their respective organizations, while off-site food trucks and arts and crafts vendors presented their offerings. Individuals with a competitive streak took part in lawn games such as cornhole and frisbee. ■

Photo credits: NASA/Goddard/Debora McCallum

TO GODDARD'S BACKYARD



JIM BUSCH: THE TOAST OF THE ENGINEERING AND BEER WORLDS

By [Jenny Hottle](#)

What does your job at Goddard entail?

I'm the ground systems manager for ICESat-2. I'm six years in, and it's been great because the team is awesome. The mission itself is fantastic. We'll be measuring the height of Earth's ice sheets to monitor melting and other changes. The ground systems will support the satellite when it launches. As the ground systems manager, my main goal here is to deliver a cost-effective ground system that meets the mission needs so we can leave more money for science. You have to understand how everything fits together, where the focus needs to be and where the risks are.

What do you like the most about working at Goddard?

It's funny. You blink, and 20 or 30 years go by. But that's what is nice about working here. It's a great place to be. There are a lot of other things you can do in life, especially with engineering. But at the end of the day, life is short, and I wanted to do something that makes a difference over time. The other thing that's so rewarding about Goddard is that you have so many smart people from different disciplines pulling together to make projects work.

What sparked your interest in engineering?

It was kind of a process of elimination. I was in business school at the University of Maryland, but I didn't like it. It didn't motivate me, and I ended up drifting toward the sciences. Two years in, I tried to transfer to the engineering school. At the time, the university was cutting down the number of applicants and raising the bar. I graduated three years later with a degree in electrical engineering.

I heard that you enjoy brewing beer. How did you get into home brewing?

I had a friend who was into brewing. Back then, there weren't many home brewers. As I tasted his home brew, which was pretty good, I thought that if he could do it, I could probably do it, too.

For Christmas in 1988, the same year I started working at Goddard, my mom went to the local home brew shop and bought me the equipment and an ingredient kit. Three days later, I brewed my first batch of beer, and in 1989, I brewed 45 batches. I brought my beer to a home brew club that I joined for feedback and critiques. Before long, people were flocking to my beer.

Eventually, your passion for home brewing led you and your friends to start a brewery. What inspired you all to take that risk?



At a home brew meeting, I met Ron Barchet. I became friends with Ron and his childhood friend, Bill Covalesski, in the late 1980s. Ron became a brewmaster at Dominion Brewery in Virginia, and Bill became the brewer at Baltimore Brewing Company. We would meet up at one of the breweries and learn from each other. One day, they showed up with this schematic of a brewery and said to me, "We want to open this brewery." We were 28 years old. I became one of the first investors, and some other people from the home brew club wrote checks, too.

So, we launched Victory Brewing Company. We made it through the hard years in the late 1990s and early 2000s, and we became the microbrewery of the Philadelphia region — and we still are today. We're making about 150,000 barrels a year right now, which makes us the 29th largest craft brewer in the country.

How do you find a balance between your work at Goddard and Victory?

I have a typical Type A personality. I get obsessive about hobbies, and I pursue them to the max. It's important to live with passion. Find a passion, and pursue it. I need to feed my passion and keep my day job. Both choices have turned out perfectly. I don't know what the future holds, but I've had a terrific career so far. ■

Center: Jim Busch

Photo courtesy: NASA/Goddard/Jim Busch